

CLAIMS

We claim:

1 1. An integrated on-line system with an enhanced data
2 transfer protocol for transferring data on a TCP/IP network,
3 comprising at least one computer configured as a data transfer
4 server connected to the network, the data transfer server having:

5 (a) a web server means for providing a plurality of
6 clients with a browser-based interface with said data transfer
7 server;

8 (b) a relational database, said web server communicating
9 with the database for retrieving and recording information,
10 said database having means for establishing and maintaining an
11 electronic mailbox for a plurality of clients; and

12 (c) a data transfer protocol means for providing a socket
13 to socket connection with a client for the transfer of data
14 according to an enhanced data transfer protocol, said protocol
15 means having:

16 (i) means for receiving data from a first client and a
17 request to forward the data to a second client;

18 (ii) means for immediately transferring the data to the
19 second client when the second client is connected to said
20 data transfer server by a socket when the data is
21 received by said data transfer server;

22 (iii) means for storing the data in an electronic mailbox
23 when the second client is not connected to said data

24 transfer server when the data is received by said data
25 transfer server; and
26 (iv) means for recording the receipt and transfer of data
27 in said relational database.

1 2. The integrated on-line system according to claim 1,
2 further comprising means for registering a plurality of trading
3 partners as clients permitted to use the system for transferring
4 data.

1 3. The integrated on-line system according to claim 1,
2 wherein said data transfer protocol means further comprises means
3 for notifying the first client when the data transfer server
4 receives the data sent by the first client.

1 4. The integrated on-line system according to claim 1,
2 further comprising means for permitting a client to determine the
3 status of a data transfer recorded in said relational database
4 through said web server means.

1 5. The integrated on-line system according to claim 1,
2 wherein said data transfer protocol means further comprises:

3 (a) means for permitting a client to connect to said data
4 transfer protocol means for a send session, wherein the client
5 transfers data to the server for transfer to a second client
6 and the session ends;

7 (b) means for permitting a client to connect to said data
8 transfer protocol means for a receive session, wherein the
9 client receives data from the server sent by a second client
10 and the session ends; and

11 (c) means for permitting a client to connect to said data
12 transfer protocol means for an end-to-end session, wherein the
13 client transfers data to the server for transfer to a second
14 client and said data transfer server keeps the session open
15 for an immediate response from the second client.

1 6. The integrated on-line system according to claim 1,
2 wherein said data transfer protocol means further comprises means
3 for validating a header sent by a client against information
4 recorded in said relational database, the header including
5 identification of a client's electronic mailbox, and means for
6 terminating a socket connection before receiving a data transfer
7 upon failure of the validation.

1 7. The integrated on-line system according to claim 1,
2 further comprising:

3 (a) a plurality of client computers connected to the
4 network; and

5 (b) client software means residing on said client
6 computers for communicating with said data transfer server
7 according to said enhanced data transfer protocol, said client
8 software means including means for establishing a socket to
9 socket connection with said data transfer server for the
10 transfer of data according to an enhanced data transfer
11 protocol, said client software means further including means
12 for sending a header to said data transfer server, the header
13 encoding a type of session requested, an identification of the
14 client's electronic mailbox, and an optional identification of
15 a recipient client's electronic mailbox.

1 8. The integrated on-line system according to claim 7,
2 wherein said client software means is platform independent for
3 integration into any application residing on said client computer.

1 9. The integrated on-line system according to claim 1,
2 further comprising encryption means for encrypting data sent to and
3 from said data transfer server.

1 10. The integrated on-line system according to claim 1,
2 further comprising:

3 (a) data encryption means for encrypting data based upon
4 a data key; and

5 (b) header encryption means for encrypting header data
6 based upon a header key, the header data including the data
7 key.

1 11. The integrated on-line system according to claim 10,
2 further comprising means for changing the header key from session
3 to session, including means for initializing and re-initializing
4 the header key.

1 12. A computerized method for enhanced data transfer between
2 a plurality of clients through a data transfer server in a TCP/IP
3 network, comprising the steps of:

4 (a) providing the server with a web server and a
5 relational database;

6 (b) registering a plurality of trading partners as
7 clients through said web server, including establishing an
8 electronic mailbox, assigning a unique mailbox ID, and a
9 password for each client and recording the mailbox ID and
10 password in said relational database;

11 (c) listening for a client on a port dedicated to
12 providing enhanced data transfer service;

13 (d) receiving a header from a client, the header
14 containing at least the client's mailbox ID and password and
15 a session request;

16 (e) validating the mailbox ID and password against said
17 relational database;

18 (f) creating a socket to socket connection with the
19 client upon validating the mailbox ID and password;

20 (g) when the session request is for receiving at least
21 one data transfer, transferring the data to the client and
22 recording the transfer in said relational database;

23 (h) when the session request is for sending at least one
24 data transfer, receiving a data transfer including a header,
25 the header having a receiving client's mailbox ID;

(i) sending the client an acknowledgement that the server has received the data transfer;

(k) determining whether the receiving client is currently connected to the server, and if so, notifying the receiving client of a pending data transfer and transferring the data to the receiving client immediately and before disconnecting with the receiving client;

(1) saving the data transfer in the receiving client's mailbox when the receiving client is not currently connected to the server;

(m) recording the server's receipt of the data transfer, the server's transfer of data to a receiving client, and the server's mailbox storing of a data transfer in said relational database; and

(n) terminating the socket to socket connection with the client.

13. The method according to claim 12, further comprising the step of permitting a client to query said relational database through said web server concerning status of data transfers to and from the client.

1 14. The method according to claim 12, further comprising the
2 steps of notifying the receiving client that a response is
3 requested, keeping the socket to socket connection open pending a
4 response, and transferring a response to the client when an end-to-
5 end session is requested.

1 15. The method according to claim 12, further comprising the
2 steps of:

- 3 (a) prior to step (d), negotiating a header encryption
4 key between client and server;
- 5 (b) before step (e), decrypting the header using the
6 header encryption key, the header further comprising an
7 encrypted portion having a second header encryption key for
8 use in a client's next session, and when the session request
9 is for a sending session, an encrypted data key for transfer
10 to a receiving client.

1 16. The method according to claim 15, further comprising the
2 step of transmitting an encrypted header containing the data key
3 for decrypting the data transfer prior to transferring the data in
4 step (g).

1 17. A computerized method for transferring encrypted data
2 between a sending client, a receiving client, and a server in a
3 TCP/IP network, comprising the steps of:

4 (a) negotiating a sender's initial header key between the
5 sending client and the server;

6 (b) negotiating a receiver's initial header key between
7 the receiving client and the server;

8 (c) the server receiving a header from a sending client
9 having header data encrypted based upon the sender's header
10 key, the header data having a data key;

11 (d) the server decrypting the header and transmitting an
12 acknowledgement to the sending client;

13 (e) the server receiving a data transfer from the sending
14 client, the data transfer being encrypted based upon the data
15 key;

16 (f) the server transmitting a second header to the
17 receiving client, the second header having header data
18 encrypted based upon the receiver's header key, the header
19 data having the data key; and

20 (g) the server transmitting the data transfer to the
21 receiving client, the data transfer being encrypted based upon
22 the data key

23 whereby the data key is passed from the sending client to the
24 server encrypted by the sending client's header key and from the
25 server to the receiving client encrypted by the receiving client's
header key, the data encrypted by the data key being transferred

from the sending client to the receiving client without decryption by the server.

1 18. The method according to claim 17, further comprising the
2 step of updating the sending client' header key, the sending client
3 encoding a new header key in the encrypted header data received by
4 the server in step (c).